

## SOCIETIES AND ACADEMIES.

## LONDON.

**Faraday Society**, March 30.—A new electrical hardening furnace: E. **Sabersky** and E. **Adler**. The furnace consists of a fireclay crucible containing a bath of metallic salts. By means of an electric current these salts are melted and kept at any desired temperature up to 1400° C. An alternating current of a voltage not exceeding 70 is employed. The process consists in heating the steel to a temperature above the transition line and then rapidly cooling it down. The cost of operating this electrical furnace is lower than that of gas-fired muffle or bath furnaces.—The relation between composition and conductivity in solutions of *meta*- and *ortho*-phosphoric acids: Dr. E. B. R. **Prideaux**. The results of simultaneous determinations of amounts of  $HPO_3$  and  $H_3PO_4$  and of the electrical conductivity show that the conductivity of the changing solution decreases at first slowly and then more rapidly, and then more slowly again.—The electro-analysis of mercury compounds with a gold cathode: Dr. F. Mollwo **Perkin**. The results obtained were always slightly too high, from 0.5 per cent. to 1 per cent. This was at first attributed to occluded hydrogen, but this was finally not considered to be the cause, and no good explanation could be found. With silver cathodes similar results were obtained. Two new quartz vessels for depositing mercury on a mercury cathode were also described. It is considered that for mercury determinations a mercury cathode with rotating anode should be employed.

**Royal Astronomical Society**, April 7.—Prof. H. H. Turner, F.R.S., vice-president, in the chair.—Description of a Chinese planisphere: E. B. **Knobel**. This planisphere had been exhibited at the Franco-British Exhibition as "a bronze compass," believed to be Japanese. It was undoubtedly Chinese. The stars are shown by raised dots, linked together in groups, forming the Chinese asterisms, each of which consists of one or more stars. These asterisms do not represent areas of the heavens like our constellations, with which they have no relation. The Chinese "siou," or lunar mansions, were explained and described.—The 60-inch reflecting telescope of the Mount Wilson Observatory, California: Dr. G. W. **Ritchey**. The mirror was successfully cast in France, and figured and polished at Pasadena, in the observatory workshops, where the Cassegrain mounting was also constructed. Details of the whole work were given and illustrated by lantern-slides. The great difficulties connected with the transport of the mirror and mounting to the summit of Mount Wilson were overcome, and the telescope is now mounted in a 50-feet dome erected for it. Dr. Ritchey is now on a visit to Europe arranging for the casting of the disc for a still larger reflector, 100 inches in diameter, which has presented considerable difficulties.—Photographs of comet Morehouse: S. S. **Hough**. These have been taken at the Cape after the comet's perihelion passage, and show that the remarkable changes of form exhibited by the comet from September to November have continued after its perihelion passage.—Astronomy in Australia: W. E. **Cooke**. An account was given of the conditions for astronomical research, and the difficulties experienced in maintaining the efficiency of the public observatories.—Photographs of Jupiter taken at the opposition of 1908-9: J. H. **Reynolds**.—The number of faint stars with large proper motions, and further note on the position of the sun's axis of rotation: H. H. **Turner**.—The orbit of the eighth satellite of Jupiter: A. C. D. **Crommelin**. The orbit, as determined by Messrs. Cowell, Crommelin, and Davidson, was in good agreement with the observed positions of the satellite, but must at present be considered as provisional, and did not form a closed curve.

## MANCHESTER.

**Literary and Philosophical Society**, March 23.—Prof. A. Schuster, F.R.S., in the chair.—The moving force of terrestrial and celestial bodies in relation to the attraction of gravitation: Dr. H. **Wilde**. Reference was briefly made by the author to the historic controversy which exercised the minds of distinguished men of science and learning for more than two centuries as to whether the

force of a body in motion by the free action of gravity is simply as the velocity, according to Descartes and Newton, or as the square of the velocity in agreement with Leibnitz and proved experimentally by Smeaton, Wollaston, Ewart, Dalton, Joule, and others; but no attempts have been made to extend the results of these experiments to the motions of celestial bodies. The author has demonstrated that the moving force, and the attraction of gravitation, are alike inversely proportional to the square of the distance, and are correlated equally in amount to maintain and retain the moon and other celestial bodies in their orbits during their revolutions round their primaries.—The action of hydrogen on sodium: A. **Holt**, jun. Some experiments were described on the action of hydrogen on sodium which, when considered with the work of Moissan and of Troost and Hautefeuille, point to the conclusion that the hydride  $Na_2H$  described by these latter authors should probably be regarded as a solid solution of the hydride  $NaH$  in sodium, and not as a definite compound.—Differences in the decay of the radium emanation: Prof. E. **Rutherford** and Y. **Tuomikoski**.

## PARIS.

**Academy of Sciences**, April 5.—M. Bouchard in the chair.—Observations on *Lepidostrobus Brownii*: R. **Zeiller**. The specimen, a detailed study of which is given in the present paper, was collected at Cabrieres by M. l'Abbé Thérond.—Remarks by M. **Carpentier** on a set of standards of length, presented by M. Johansson. These standards are in the form of parallelepipeds, two faces of which are rigorously plane and parallel, and the distance between these two faces is known to 1/100,000th of its value. Any length between 1 mm. and 200 mm. can be built up, the error being less than 1 micron. A smaller set of standards have an accuracy of 0.1 micron. These standards are manufactured on the commercial scale, and represent a surprising advance on any test-pieces hitherto obtainable.—A new general method for the preparation of the alcoholic amines: Paul **Sabatier** and A. **Mailhe**. In a previous paper the authors have described the catalytic decomposition of alcohols by certain oxides, such as alumina, thoria, and the blue oxide of tungsten. If, in this experiment, the alcohol vapour is replaced by a mixture of dry ammonia and alcohol vapour, no ethylenes are produced, but the action which predominates is the formation of the amine. Details are given of the method, which is extremely simple, the reaction product containing unchanged alcohol, ammonia, primary amine, secondary amine, and a little tertiary amine.—M. Wiesner was elected a correspondant in the section of botany in the place of the late M. Clos.—Contact transformations: S. **Lattès**.—The representation of the solutions of a linear equation of finite differences for large values of the variable: M. **Galbrun**.—The radiation and temperature of the flame of a Bunsen burner: Edmond **Bauer**. Two methods of measuring the flame temperature, the measurement of the ratio of emission to absorption and the reversal of the D ray, gave identical results, about 1760° C., for the Meker burner. The author comes to the conclusion that temperature is the essential factor in the emission of line spectra by flames.—The radiation of potassium salts: E. **Henriot**. It has been shown that potassium salts possess a distinct, although very small, radio-activity. It has not yet been settled whether this radio-activity is due to the presence of traces of one of the radio-active bodies already known. From the experiments described in the present paper, it would appear that this is not the case; the observed radio-activity must be either due to the potassium itself or to an unknown body associated with it.—A new type of magnetic decomposition of the absorption bands of crystals. The simultaneous production of systems circularly polarised in opposite senses: Jean **Becquerel**. The line  $625 \mu\mu$  of tysonite, at the temperature of solid hydrogen, -253° C. to -259° C., gives a quadruplet formed of two doublets polarised in opposite senses. The effects observed can be explained by the hypothesis of the existence of both negative and positive electrons, and the author replies to some objections raised by M. Dufour concerning the theory of positive electrons.—The determination of the constant of Stefan's law: C. **Féry**. In a preceding note it has been shown that in measurements

of radiation it is absolutely essential to use an integral receiver. In the present paper a form of receiver is described satisfying the necessary conditions, and with this apparatus the exactitude of Stefan's law has been proved. The constant found is  $6.30 \times 10^{-12}$  watt/cm.<sup>2</sup>, as against the earlier figure of 5.32, for  $\pi a$ , from which  $a$  is  $2 \times 10^{-12}$  watt/cm.<sup>2</sup>—The atmosphere of rooms for the inhalation of mineral water in the form of fine spray. The identification of the mineral water spray with the water of the spring: M. **Cany**.—The formation of graphitic oxide and the definition of graphite: Georges **Charpy**. Brodie's reagent, fuming nitric acid and potassium chloride, may be replaced by other oxidising mixtures, such as concentrated sulphuric acid and potassium permanganate or chromic acid. The reaction is accelerated by a rise of temperature, but with loss of carbon as carbon dioxide. The definition of graphite based on the action of such oxidising mixtures is unsatisfactory.—The preparation of pure iodic anhydride: Marcel **Guichard**. The iodic acid prepared by the action of sulphuric acid on barium iodate is not pure, containing either barium iodate or barium sulphate, according as the salt or the acid is in excess. Iodic acid is very soluble in water (187.4 per 100), but is much less soluble in nitric acid (S.G. 1.4), and advantage is taken of this fact for the purification of iodic acid. A better method is the oxidation of iodine with nitric anhydride; a yield of 40 per cent. of the theoretical is thus obtained.—The complete synthesis of laudanosine: Amé **Pictet** and Mlle. M. **Finkelstein**. This synthesis of laudanosine (methyl-tetrahydropapaverine) is the first artificial preparation of an opium alkaloid.—The catalytic preparation of the ketones: J. B. **Sendorens**. The catalytic production of ethers by the action of alumina on the alcohols has been found to be limited in practice to methyl and ethyl ethers, other condensation products appearing with the higher alcohols. The corresponding reaction for the production of ketones, on the other hand, is much more general. Anhydrous thoria is used as the catalytic agent, and the fatty acid is found to give good yields of ketone at a temperature of about 400° C. A description is given of the preparation of diethylketone, dipropylketone, and di-isopropylketone by this method.—The formation of peroxides in the oxidation of the organo-magnesium compounds: H. **Wuyte**.—The tetrahydronaphthylglycols (*cis* and *trans*) and their combination: Henri **Leroux**.—A new region with sodic rocks in Auvergne. Tephrites and nephelinites in "la Comté": J. **Giraud** and A. **Plumandon**.—The composition of bauxite: M. **Arsandaux**.—Some variations of *Monophyllaea Horsfieldii*: M. **Chiffot**.—The sexual reproduction of *Endomyces Magnusii*: A. **Guilliermond**.—The exact estimation, by gasometry, of urea and urinary ammonia: M. **Florence**.—New analogies between the natural and artificial oxydases: J. **Wolff**.—Animal invertins and lactases: H. **Bierry**.—Bovine piroplasmosis in the neighbourhood of Algiers: H. **Soulié** and G. **Roig**.—The calcification of tuberculous lesions in bovine animals: their richness in Koch bacilli: M. **Piettre**. Calcification of tuberculous lesions is no sign of cure, and any therapeutic method based on the introduction of calcium salts into the economy is illusory.—The palpal cavity and its attachments: Rémy **Perrier** and Henri **Fischer**.—The fossil Bryozoa of the Middle Miocene of Marsa-Matrouh: Ferdinand **Canu**.—The cause of the heat developed in the terrestrial rocks: J. A. **Le Bel**. The effect observed appears to be due to radiation, and not to radio-activity.

## DIARY OF SOCIETIES.

**FRIDAY, APRIL 16.**

MALACOLOGICAL SOCIETY, at 8.—Description of *Pomatiopsis Harmeri*, n.sp., from the Red Crag of Essex: A. S. Kennard.—Fossil Pearl Growths: J. Wilfred Jackson.—The New Zealand Athoracophoridae, with Descriptions of Two New Forms: Henry Suter.—On the Family Ampullariidae, No. 1, Ampullaria (*sensus stricto*), List of Species, Varieties, and Synonyms, with Descriptions of New Forms: G. B. Sowerby.

**TUESDAY, APRIL 20.**

ROYAL INSTITUTION, at 3.—The Brain in Relation to Right-handedness and Speech: Prof. F. W. Mott, F.R.S.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The *New York Times* Building: C. T. Purdy.

ROYAL SOCIETY OF ARTS, at 4.30.—South Africa: Hon. C. G. Murray.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—The Blackfeet Indians of Montana: W. MacIntosh.

NO. 2059, VOL. 80]

**WEDNESDAY, APRIL 21.**  
 ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Percolation, Evaporation, and Condensation: B. Latham.—The Meteorological Conditions in the Philippines, 1908: Rev. José Algué, S.J.

ROYAL MICROSCOPICAL SOCIETY, at 8.—On the Recent and Fossil Foraminifera of the Shore-sands of Selsea Bill, Sussex: E. Heron-Allen.—The Disappearance of the Nucleolus in Mitosis: E. J. Sheppard,

**THURSDAY, APRIL 22.**

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Dynamic Osmotic Pressures: The Earl of Berkeley, F.R.S., and E. G. J. Hartley.—(1) The Theory of Ancestral Contributions in Heredity; (2) The Ancestral Gametic Correlations of a Mendelian Population Mating at Random: Prof. Karl Pearson, F.R.S.—The Intracranial Vascular System of Sphenodon: Prof. A. Dendy, F.R.S.—On the Graphical Determination of Fresnel's Integrals: J. H. Shaxby.

MATHEMATICAL SOCIETY, at 5.30.—The General Principles of the Theory of Integral Equations: F. Tavani.—The Equations of Electrodynamics and the Null Influence of the Earth's Motion on Optical and Electrical Phenomena: H. R. Hasse.—The Solution of a Certain Transcendental Equation: G. N. Watson.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Electrical System of the London County Council Tramways: J. H. Rider.

**FRIDAY, APRIL 23.**

ROYAL INSTITUTION, at 9.—Tantalum and its Industrial Applications: A. Siemens.

PHYSICAL SOCIETY, at 5.—On a Want of Symmetry shown by Secondary X-Rays: Prof. W. H. Bragg, F.R.S., and J. L. Glasson.—Transformations of X-Rays: C. A. Sadler.—Theory of the Alternate Current Generator: Prof. T. R. Lyle.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Development of Hydroelectric Power Schemes; with Special Reference to Works at Kinlochleven: J. M. S. Culbertson.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—Presidential Address: J. A. F. Aspinall.

## CONTENTS.

PAGE

Popular Science. By William E. Rolston . . . . .	181
Rare Elements. By J. H. G. . . . .	182
A General History of Science . . . . .	182
Sanitary Science . . . . .	183
Crustacea of Norway. By W. A. Cunningham . . . . .	184
British Fungi. By A. D. C. . . . .	184
Our Book Shelf:—	
Freeman: "The Planning of Fever Hospitals and Disinfecting and Cleansing Stations" . . . . .	185
Johnson: "Photographic Optics and Colour Photography, including the Camera, Kinematograph, Optical Lantern, and the Theory and Practice of Image Formation" . . . . .	185
Platen: Untersuchungen fossiler Hölzer aus dem westen Vereinigten Staaten von Nordamerika" . . . . .	185
Letters to the Editor:—	
The Rate of Fall of Fungus Spores in Air. (Illustrated.)—Prof. A. H. Reginald Buller . . . . .	186
Ionisation by Röntgen Rays.—Dr. Charles G. Barkla . . . . .	187
A Simple Fabry and Perot Interferometer. (Illustrated.)—Prof. James Barnes . . . . .	187
An Ornithological Coincidence.—Dr. Henry H. Giglioli . . . . .	188
April Meteors.—John R. Henry . . . . .	188
The Gramophone as a Phonautograph. (Illustrated.) By Prof. John G. McKendrick, F.R.S. . . . .	188
The Poisons of the Pharmacy Act. By C. Simmonds . . . . .	191
Rainfall in Italy . . . . .	192
Simple Studies in Natural History. (Illustrated.) . . . . .	192
International Chart of the Heavens . . . . .	193
Dr. Arthur Gamgee, F.R.S. By G. A. B. . . . .	194
Notes . . . . .	196
Our Astronomical Column:—	
Observations of Comet Morehouse . . . . .	200
Measures of Double Stars . . . . .	200
Diameter and Position of Mercury . . . . .	200
The Vatican Observatory . . . . .	200
Producer Gas for Engines. I. Processes and Plants. (Illustrated.) By J. Emerson Dowson . . . . .	200
The Scope of Eugenics . . . . .	203
Scientific Work of the Local Government Board. By R. T. H. . . . .	203
German Anthropological Papers . . . . .	204
New Crucible Support and Furnace . . . . .	204
The Defects of English Technical Education and the Remedy. By Dr. Robert Pohl . . . . .	205
University and Educational Intelligence . . . . .	208
Societies and Academies . . . . .	209
Diary of Societies . . . . .	210